

REMARKS

This Amendment is filed in response to the Second Office Action dated November 26, 2007, which has a shortened statutory period set to expire February 26, 2008. A one-month extension is provided herewith, thereby extending the time of response to March 26, 2007

Overview of the Admitted Prior Art and the Invention

A conventional prior art system can include multiple static timing analysis (STA) tools that use various set-ups for modes and corners. See, e.g. Figure 1B, tools 100A, 100B, and 100C. Notably, as taught by Applicant in the Specification, paragraphs [0006-0007] and referring to Figure 1B:

As STA tools 102A-102C complete their analysis, user 112 can review the results of the static timing analysis and perform debugging 113, as necessary, to mitigate timing violations. Of importance, user 112 must manually perform this user analysis/debugging 113 on results 103A-103C. Unfortunately, results 103A-103C typically form large, complex files in which each critical path in the design must be individually extracted for path profiling. Moreover, performing a comprehensive static timing analysis using available modes and corners can take many runs, e.g. 100-200 runs. Therefore, managing and/or merging the results from these runs can be very complex and time consuming.

Therefore, a need arises for a system and method of efficiently managing multiple static timing analysis runs using multiple modes/corners.

Applicants provide an STA system and method that can manage multiple runs having different parameters and automatically merge the results from those runs. Specification, paragraph [0009]. Parameters can include, for example, a plurality of modes and corners. Specification, paragraph [0009]. Exemplary modes can include a test mode, a normal operation mode, and a power-down mode, whereas exemplary corners can include process

parameters including minimum/maximum temperatures as well as minimum/maximum voltages. Specification, paragraph [0009].

Notably, the saved results from each run can include intermediate results to support arbitrary queries.

Specification, paragraph [0027]. These intermediate results can include a predetermined set of parameters that can be advantageously used in creating additional results.

Specification, paragraph [0027]. Exemplary saved results are listed in the Specification, paragraph [0028].

By analyzing such intermediate results to construct the merged results, a user can quickly and intelligently make decisions in debugging a design. Specification, paragraph [0017]. For example, the merged results can advantageously indicate whether the design has been exhaustively analyzed for a mode and/or corner, whether the design has been exhaustively analyzed for all corners/modes, and what parts of the design have not been analyzed. Specification, paragraphs [0030-0031]. The merged results can also advantageously indicate for each path a percentage of times that timing violations exist for all analyzed modes and corners. Specification, paragraph [0012].

Claims 1, 3-9, 12-19, 25, 27-30, 32-43, 45, 47-53, 55-62, 64-70,
and 72-78 Are Patentable Over Schulz and Schultz

Claim 1, as amended, recites:

saving intermediate results from the multiple static timing analysis runs; and

analyzing the intermediate results to construct merged results, ...

wherein the merged results indicate at least one of: what parts of the design have not been analyzed, whether the design has been exhaustively analyzed for a particular corner/mode, and whether the design has been exhaustively analyzed for all corners/modes.

Applicant respectfully submits that neither Schulz nor Schultz teach analyzing intermediate results to construct merged results. The Examiner admits that Schulz does not teach merging of the results, but cites Schultz to remedy that deficiency. As recited in Claim 1, the intermediate results are analyzed to construct merged results. The merged results can then advantageously indicate at least one of: what parts of the design have not been analyzed, whether the design has been exhaustively analyzed for a particular corner/mode, and whether the design has been exhaustively analyzed for all corners/modes.

Schultz cannot provide this level of detail. Specifically, Schultz merely compiles information, which can be sorted to identify potentially suspect nodes (e.g. nodes with high timing delays). Paragraphs [0045-0048]. Schultz can then investigate nodes with the highest percentage changes (i.e. the relative differences of the values of each node between the multiple corners) and allow adjustment of those nodes prior to sending the IC to manufacturing. Paragraph [0048].

Thus, as clarified by Applicant, the analysis of the intermediate results allow the merged results to provide a depth of analysis to a user that would not be possible using the combined teachings of Schulz and Schultz. That is, even when combined, Schulz and Schultz do not provide the recited merged results because neither reference teaches the analysis of the intermediate results. In contrast, the recited merged results advantageously allow a user to quickly and intelligently make complex decisions in debugging a design. Because Schulz and Schultz fail to disclose or suggest the recited analysis of intermediate results as well as the recited merged results and its advantages, Applicant requests reconsideration and withdrawal of the rejection of Claim 1.

Claims 3-9 and 12-18 depend from Claim 1 and therefore are patentable for at least the reasons presented for Claim 1.

Based on those reasons, Applicants request reconsideration and withdrawal of the rejection of Claims 3-9 and 12-18.

Claim 19, as amended, also recites:

saving intermediate results from the multiple static timing analysis runs; and

analyzing the intermediate results to construct merged results ...

wherein the merged results indicate at least one of: what parts of the design have not been analyzed, whether the design has been exhaustively analyzed for a particular corner/mode, and whether the design has been exhaustively analyzed for all corners/modes.

Therefore, Claim 19 is patentable for the same reasons presented for Claim 1. Based on those reasons, Applicant requests reconsideration and withdrawal of the rejection of Claim 19.

Claim 25, as amended, recites in part:

a second set of instructions for saving intermediate results from the multiple static timing analysis runs; and

a third set of instructions for analyzing the intermediate results to automatically construct merged results, ...

the merged results indicating at least one of: what parts of the design have not been analyzed, whether the design has been exhaustively analyzed for a particular corner/mode, and whether the design has been exhaustively analyzed for all corners/modes.

Therefore, Claim 25 is patentable for substantially the same reasons presented for Claim 1. Based on those reasons, Applicants request reconsideration and withdrawal of the rejection of Claim 25.

Claims 27-30 and 32 depend from Claim 25 and therefore are patentable for at least the reasons presented for Claim 25.

Based on those reasons, Applicants request reconsideration and withdrawal of the rejection of Claims 27-33 and 32.

Claim 33, as amended, now recites in part:

a second set of instructions for saving intermediate results from the multiple static timing analysis runs;

a third set of instructions for analyzing the intermediate results to construct merged results, the merged results indicating at least one of: what parts of the design have not been analyzed, whether the design has been exhaustively analyzed for a particular corner/mode, and whether the design has been exhaustively analyzed for all corners/modes.

Therefore, Claim 33 is patentable for substantially the same reasons presented for Claim 1. Based on those reasons, Applicants request reconsideration and withdrawal of the rejection of Claim 33.

Claim 34, as amended, recites in part:

saving intermediate results from each static timing analysis run to external storage;

reading sets of saved intermediate results;

analyzing the saved intermediate results to construct merged results ...

the merged results indicating at least one of: what parts of the design have not been analyzed, whether the design has been exhaustively analyzed for a particular corner/mode, and whether the design has been exhaustively analyzed for all corners/modes.

Therefore, Claim 34 is patentable for substantially the same reasons presented for Claim 1. Based on those reasons, Applicants request reconsideration and withdrawal of the rejection of Claim 34.

Claims 35-43 depend from Claim 34 and therefore are patentable for at least the reasons presented for Claim 34. Based on those reasons, Applicants request reconsideration and withdrawal of the rejection of Claims 35-43.

Claim 45, as amended, recites in part:

saving intermediate results from the multiple static timing analysis runs; and
analyzing the intermediate results to construct merged results, ...

wherein the merged results indicate at least one of: what parts of the design have not been analyzed, whether the design has been exhaustively analyzed for a particular corner/mode, and whether the design has been exhaustively analyzed for all corners/modes.

Therefore, Claim 45 is patentable for the same reasons presented for Claim 1. Based on those reasons, Applicants request reconsideration and withdrawal of the rejection of Claim 45.

Claims 47-53 and 55-61 depend from Claim 45 and therefore are patentable for at least the reasons presented for Claim 45. Based on those reasons, Applicants request reconsideration and withdrawal of the rejection of Claims 47-53 and 55-61.

Claim 62, as amended, recites in part:

saving results from the multiple static timing analysis runs; and

analyzing the saved results to construct merged results, the merged results providing analysis coverage that reports parts of the design that are analyzed for each mode and corner as well as parts of the design that are not analyzed for each mode and corner.

Therefore, Claim 62 is patentable for substantially the same reasons presented for Claim 1. Based on those reasons, Applicants request reconsideration and withdrawal of the rejection of Claim 62.

Claims 64-70 and 72-78 depend from Claim 62 and therefore are patentable for at least the reasons presented for Claim 62. Based on those reasons, Applicants request reconsideration and withdrawal of the rejection of Claims 64-70 and 72-78.

New Claims 83-96 Are Patentable Over Schulz And Schultz

Claim 83 recites in part:

saving intermediate results from the multiple static timing analysis runs; and
analyzing the intermediate results to construct merged results, the merged results indicating for each path a percentage of times that timing violations exist for all analyzed modes and corners.

Therefore, Claim 83 is patentable for substantially the same reasons presented for Claim 1. Based on those reasons, Applicants request allowance of Claim 83.

Claims 84-96 depend from Claim 83 and therefore are patentable for at least the reasons presented for Claim 83. Based on those reasons, Applicants request allowance of Claims 84-96.

CONCLUSION

Claims 1, 3-9, 12-19, 25, 27-30, 32-43, 45, 47-53, 55-62, 64-70, 72-78, and 83-96 are pending in the present application. Allowance of these claims is respectfully requested.

If there are any questions, please telephone the undersigned at 408-451-5907 to expedite prosecution of this case.

Respectfully submitted,



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